

Chemistry of Metals and Alloys

Хімія металів і сплавів

AVAILABLE ON-LINE

at www.chemetal-journal.org

An international journal published by
Ivan Franko National University of Lviv



December 2012

Volume 5, Issue 3/4, Pages 113-181

Chemistry of Metals and Alloys

An international journal published by IVAN FRANKO NATIONAL UNIVERSITY OF LVIV

Editorial board

Prof. Roman GLADYSHEVSKII (editor-in-chief)	Ivan Franko National University of Lviv, Ukraine
Prof. Evgeny ANTIPOV	Lomonosov Moscow State University, Russia
Prof. Ihor BARCHIY	Uzhgorod National University, Ukraine
Prof. Anatolii BILOUS	V.I. Vernadsky Institute of General and Inorganic Chemistry, Kyiv, Ukraine
Prof. Marina BULANOVA	I.M. Frantsevich Institute for Problems of Materials Science, Kyiv, Ukraine
Prof. Dariusz KACZOROWSKI	Institute of Low Temperature and Structure Research, Wroclaw, Poland
Prof. Yaroslav KALYCHAK	Ivan Franko National University of Lviv, Ukraine
Prof. Bogdan KOTUR	Ivan Franko National University of Lviv, Ukraine
Prof. Maryan MYSKIV	Ivan Franko National University of Lviv, Ukraine
Prof. Henri NOËL	University of Rennes 1, France
Prof. Volodymyr PAVLYUK	Ivan Franko National University of Lviv, Ukraine
Prof. Vitalij PECHARSKY	Iowa State University, Ames, USA
Prof. Adriana SACCONI	University of Genoa, Italy
Prof. Leonid VASYLECHKO	Lviv Polytechnic National University, Ukraine
Prof. Volodymyr YARTYS	Institute for Energy Technology, Kjeller, Norway
Prof. Volodymyr ZAITSEV	Taras Shevchenko National University, Kyiv, Ukraine
Prof. Ihor ZAVALIY	G.V. Karpenko Physico-Mechanical Institute, Lviv, Ukraine
Dr. Karin CENZUAL	University of Geneva, Switzerland
Dr. Khrystyna MILIYANCHUK	Ivan Franko National University of Lviv, Ukraine

Chemistry of Metals and Alloys, Faculty of Chemistry, Ivan Franko National University of Lviv, Kyryla i Mefodiya St. 6, UA-79005 Lviv, Ukraine, Tel. +380 32 2600388, e-mail: chemetal@lnu.edu.ua.

Хімія металів і сплавів, Хімічний факультет, Львівський національний університет імені Івана Франка, вул. Кирила і Мefодія 6, 79005, м. Львів, Україна, тел. +380 32 2600388, e-mail: chemetal@lnu.edu.ua. Свідоцтво про державну реєстрацію № 12787-1671P від 03.05.2007.

Printed at Publishing Center of Ivan Franko National University of Lviv, Doroshenko St. 41, UA-79000 Lviv, Ukraine, on 26.12.2012.

© Ivan Franko National University of Lviv